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परीक्षण छलनियाँ — तकनीकी अपेक्षाएँ और परीक्षण — इलैक्ट्रोफोर्म्ड शीट की परीक्षण छलनियाँ

Indian Standard

TEST SIEVES — TECHNICAL REQUIREMENTS AND TESTING — TEST SIEVES OF ELECTROFORMED SHEETS

ICS 19.120

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 2004 **Price Group 3**

Abrasives Sectional Committee, MGP 09

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 3310-3 : 1990 'Test sieves — Technical requirements and testing — Part 3 : Test sieves of electroformed sheets' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Abrasives Sectional Committee and approval of the Medical Instruments General and Production Engineering Division Council.

The text of the ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker in the International Standard, while in Indian Standards the current practice is to use a point (.) as the decimal marker.

CROSS REFERENCE

In this adopted standard, reference appears to the following International Standard for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 565 : 1990 Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings	IS 2405 (Part 1) : 1980 Specification for industrial sieves: Part 1 Wire cloth sieves (*first revision*) IS 2405 (Part 2) : 1980 Specification for industrial sieves: Part 2 Perforated plates (*first revision*)	Technically equivalent

Where there are no corresponding Indian Standards for the International standards referred in this Indian Standard reference to the relevant International Standards may be made.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded of in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEST SIEVES — TECHNICAL REQUIREMENTS AND TESTING — TEST SIEVES OF ELECTROFORMED SHEETS

1 Scope

This part of ISO 3310 specifies the technical requirements and corresponding test methods for test sieves in which the sieving medium is a metal sheet with electrochemically formed apertures.

It applies to test sieves having round (circular) or square apertures ranging in size from 500 µm to 5 µm, in accordance with ISO 565.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 3310. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 3310 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings.*

3 Designation

Test sieves of electroformed sheet shall be designated by the shape of the apertures (round or square), the nominal size of apertures in micrometres (µm) and the description "electroformed".

4 Electroformed sheet

4.1 General requirements

Electroformed sheet in test sieves shall be free from any irregularities such as production defects, creases, wrinkles or foreign matter in the sheet.

4.2 Arrangement of apertures

Round apertures shall be arranged with their centres at the apices of equilateral triangles (see figure 1); square apertures shall be arranged in line, with their mid-points at the vertices of squares (see figure 2).

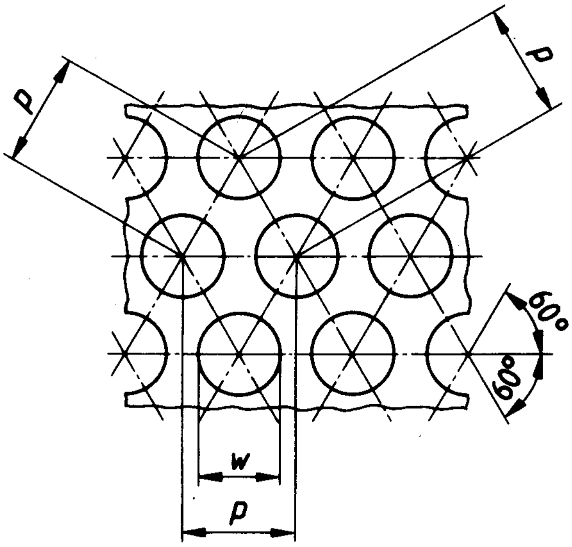


Figure 1 — Arrangement of round apertures

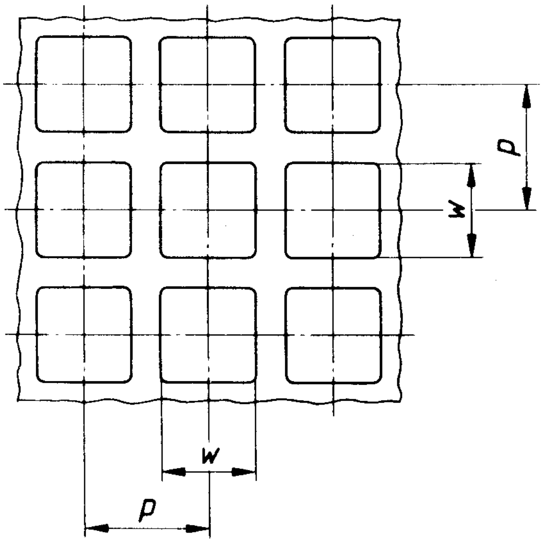


Figure 2 — Arrangement of square apertures

4.3 Dimensions

The nominal aperture sizes, preferred nominal pitches and preferred sheet thicknesses of electroformed sheet shall be as specified in table 1.

4.3.1 Tolerance on aperture size *w*

The average tolerance of all measured aperture sizes shall not exceed ±2 µm. This tolerance applies to the widths of the mid-sections of square apertures and to the diameter of round apertures, measured on the sieving side (i.e. it applies to the smallest aperture dimension; see figure 5).

4.3.2 Pitch *p*

The pitch sizes given in table 1, column 4, apply to either round or square apertures and shall be used by preference. Other pitches used shall be within the limits given in table 1, columns 5 and 6.

4.3.3 Sheet thickness *e*

The preferred sheet thicknesses given in table 1, column 7, apply to electroformed sheet with either round or square apertures, measured without sheet reinforcement, if any.

4.4 Test methods

Test 1 — General examination

View the sieving medium against a uniformly illuminated background. During this procedure turn the sieve slowly around an axis parallel to the aperture rows; this permits detection of unequal apertures.

If irregularities of aperture size are seen, the sieve is unacceptable.

Test 2 — Measurement of aperture size

Sieves which have passed test 1 shall be submitted to an examination of aperture size.

Check the apertures in nine measurement fields as shown in figure 3. In each field measure at least five apertures. Each aperture inspected shall comply with the tolerance stated in 4.3.1.

For the examination of aperture sizes above 32 µm a microscope fitted with a ×20 objective and a filar micrometer eyepiece of 10 to 12,5 power should be used. The apparatus shall be capable of making measurements to an accuracy of ±0,5 µm. The magnification of the apparatus shall be verified against a calibrated stage micrometer certified to ±0,5 µm for the 0,01 µm scale divisions and having not more than ±0,5 µm accumulated error for the complete scale.

For the examination of aperture sizes of 32 µm and below the apparatus described above is not suitable. Measurement methods for this range of aperture sizes are under study.

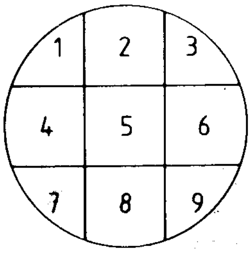


Figure 3 — Measurement fields for testing aperture size

Table 1 — Nominal aperture sizes, pitch and sheet thickness

Dimensions in micrometres

Nominal aperture sizes w			**Pitch**			**Preferred sheet thickness**
Principal sizes	Supplementary sizes		Preferred sizes	Permissible range of choice		
R 20/3	R 20	R 40/3	p_{nom}	p_{max}	p_{min}	e
(1)	(2)	(3)	(4)	(5)	(6)	(7)
500	500	500	620	710	530	50
	450		560	645	475	
		425	530	610	450	45
	400		490	555	425	
355	355	355	450	510	380	30
	315		395	480	335	
		300	380	440	320	
	280		355	420	300	
250	250	250	320	385	270	
	224		275	340	250	
		212	270	320	240	25
	200		260	305	225	
180	180	180	240	270	200	
	160		210	255	180	20 to 25
		150	200	230	170	
	140		190	230	160	
125	125	125	170	205	140	
	112		155	205	135	15 to 25
		106	150	205	130	
	100		140	170	120	
90	90	90	130	170	110	
	80		115	170	100	
		75	110	140	95	12 to 25
	71		105	140	90	
63	63	63	95	140	90	
	56		90	140	75	
		53	85	100	70	
	50		80	100	70	
45	45	45	75	100	65	
	40		70	90	60	
		38	65	85	55	
	36		65	85	55	
R′10						
32			60	85	50	10 to 25
25			50	65	45	
20			45	65	40	
16			40	65	35	
10			30	50	25	
5			25	40	20	8 to 25

5 Test sieve frame

Test sieve frames shall be circular and made of stainless steel or any other material suitable for the samples to be sieved.

The dimensions and tolerances of test sieve frames shall comply with table 2, and in principle with figure 4.

NOTE 1 It is recognized that in countries where the 203 mm (8 in), 102 mm (4 in) and 76 mm (3 in) diameter test sieves have been established as a standard by long tradition, some considerable time may elapse before the transition can be made by users to employ the sieves specified in table 2.

Table 2 — Dimensions and tolerances of test sieve frames (see also figure 4)

Dimensions in millimetres

Test sieve nominal sizes		Diameter of effective sieving surface	Approximate depth[1]
D_1	D_2		H_1
(1)	(2)	(3)	(4)
$75^{+0,3}_{0}$	$75^{0}_{-0,3}$	> 65	25
$100^{+0,4}_{0}$	$100^{0}_{-0,4}$	> 90	25
$200^{+0,8}_{0}$	$200^{0}_{-0,8}$	> 185	25 or 50

[1] Larger depths may be required for wet sieving.

6 Construction of test sieves

Depending on the production process, electroformed sheet has a cross-section in accordance with type A or type B as shown in figure 5. Sheet with type A cross-section shall be fixed in the frame with the smaller width of the apertures uppermost to facilitate undersize particles clearing the apertures.

If reinforcement of the sheet is required, a supporting screen shall be bonded to the electroformed sheet, with the apertures in both the support and the sheet running in the same direction to prevent the formation of pockets in which particles may be trapped.

The frames shall be smoothly finished and they shall nest readily with other sieves, lids and receivers of the same nominal frame diameter.

The seal of the electroformed sheet with the frame shall be so constructed as to prevent lodging of material to be sieved.

7 Marking of test sieves

A metal label permanently attached to the frame shall give the following information:

a) the shape of the aperture, by indicating a circle or a square as appropriate;

b) the nominal aperture size;

c) a reference to the standard(s) with which the test sieve is claimed to comply;

d) the material of the sheet and of the frame;

e) the name of the party (manufacturer or vendor) that is responsible for the sieve;

f) the manufacturer's identification number.

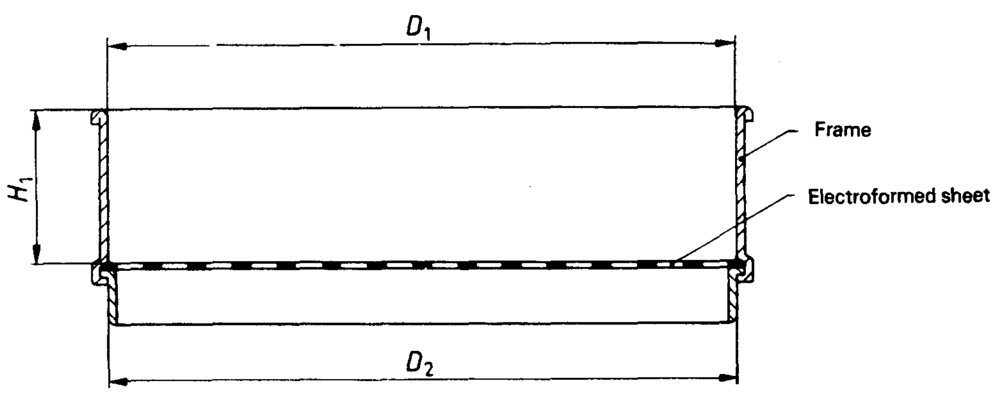
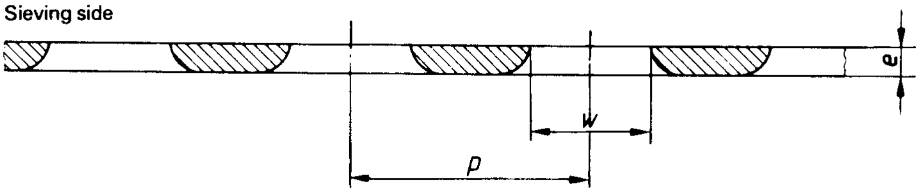
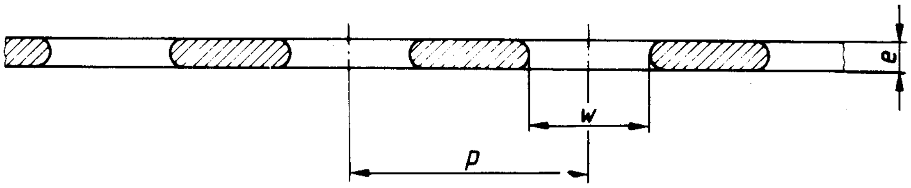


Figure 4 — Cross-section of test sieve with electroformed sheet



a) type A



b) type B

Figure 5 — Cross-section of electroformed sheet (diagrammatic)

Annex A
(informative)

Care of test sieves of electroformed sheet

Test sieves of electroformed sheet shall be handled with great care to prevent their damage. Unless otherwise recommended by the manufacturer, the sieves shall be cleaned by immersing them vertically in a suitable liquid, e.g. alcohol or deionized water with or without a trace of non-corrosive surfactant, in an ultrasonic bath for 15 s to 20 s at a frequency of not less than 40 kHz and a power input not exceeding 40 W. They shall then be rinsed in clean liquid and dried at a temperature not exceeding 80 °C.

Electroformed sheet should not be cleaned with a brush or by means of compressed air.

Test sieves with *electroformed sheet* should be inspected as detailed in 4.4 at regular intervals for compliance with this part of ISO 3310.

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Amendments Issued Since Publication

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